

**Exercise 3A**

- 1 Some data is collected. $Q_1 = 46$ and $Q_3 = 68$.

A value greater than $Q_3 + 1.5 \times (Q_3 - Q_1)$ or smaller than $Q_1 - 1.5 \times (Q_3 - Q_1)$ is defined as an outlier.

Work out whether the following are outliers using this rule:

- a 7 b 88 c 105

- 2 The masses of male and female turtles are given in grams. For males, the lower quartile was 400 g and the upper quartile was 580 g. For females, the lower quartile was 260 g and the upper quartile was 340 g.

An outlier is an observation that falls either $1 \times$ (interquartile range) above the upper quartile or $1 \times$ (interquartile range) below the lower quartile.

- a Which of these male turtle masses would be outliers?

400 g 260 g 550 g 640 g

- b Which of these female turtle masses would be outliers?

170 g 300 g 340 g 440 g

- c What is the largest mass a male turtle can be without being an outlier?

Hint The definition of an outlier here is different from that in question 1. You will be told which rule to use in the exam.

- 3 The masses of arctic foxes are found and the mean mass was 6.1 kg. The variance was 4.2.

An outlier is an observation which lies ± 2 standard deviations from the mean.

- a Which of these arctic fox masses are outliers?

2.4 kg 10.1 kg 3.7 kg 11.5 kg

- b What are the smallest and largest masses that an arctic fox can be without being an outlier?

- E** 4 The ages of nine people at a children's birthday party are recorded. $\Sigma x = 92$ and $\Sigma x^2 = 1428$.

- a Calculate the mean and standard deviation of the ages. **(3 marks)**

An outlier is an observation which lies ± 2 standard deviations from the mean.

One of the ages is recorded as 30.

- b State, with a reason, whether this is an outlier. **(2 marks)**

- c Suggest a reason why this age could be a legitimate data value. **(1 mark)**

- d Given that all nine people were children, clean the data and recalculate the mean and standard deviation. **(3 marks)**

Problem-solving

After you clean the data you will need to find the new values for n , Σx and Σx^2 .